



AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Withdrawn).
2. (New) A rotary blood pump for use in a heart assist device, said pump having an impeller suspended in use within a pump housing by hydrodynamic thrust forces generated by relative movement of said impeller with respect to and within said pump housing; and wherein at least one of said impeller or said housing includes at least a first deformed surface lying on at least part of a first face which, in use, moves relative to respective facing surfaces on the other of said impeller or said housing thereby to form a relatively moving surface pair which generates relative hydrodynamic thrust between said impeller and said housing which includes everywhere a localized thrust component substantially and everywhere normal to the surface of said first deformed surface.
3. (New) The pump of Claim 2, wherein the pump includes a hydrodynamic bearing.
4. (New) The pump of Claim 2, wherein said pump includes radial and axial direction control and said radial and axial direction control is provided by the inclusion of one set of surfaces angled with respect to the rotational axis of the impeller.
5. (New) The pump of Claim 2, wherein said impeller includes blades which are tapered or non-planar, so that a thrust is created between the edges and the pump housing during relative movement therebetween.
6. (New) The blood pump of Claim 2, wherein said pump is of centrifugal type or mixed flow configuration; and the blades form gaps in said impeller; wherein said gaps open on both front and back faces of the impeller.
7. (New) The pump of Claim 6, wherein the front face of the pump housing is generally conical shaped, to allow thrust forces to be generated generally perpendicular to an

inner conical surface of the housing and wherein said thrust forces have a radial component to resist radial displacement of the impeller axis, in use.

8. (New) The pump of Claim 2, wherein a drive torque of said impeller derives from the magnetic interaction between permanent magnets within the blades of the impeller and oscillating currents in windings encapsulated within the pump housing.

9. (New) The pump of Claim 8, wherein said pump is of an axial configuration.

10. (New) The pump of Claim 9, wherein said impeller includes tapered blade edges which form a radial hydrodynamic bearing.

11. (New) The pump of Claim 10, wherein an interior of the pump housing is constructed with a reducing radius at least one end, and wherein said end experiences thrust forces generated by impeller cooperating with the housing and said thrust forces have an axial component.

12. (New) The pump of Claim 11, wherein magnetic forces provide the axial bearing.

13. (New) The pump of Claim 2, wherein the distance between the surfaces of said relatively moving surface pair is less than 0.2 mm.

14. (New) The pump of Claim 2, wherein the distance between the surfaces of said relatively moving surface pair is less than 0.1 mm.

15. (New) The pump of Claim 2, wherein said first deformed surface forms of and is integral to at least one surface of said impeller.

16. (New) A rotary blood pump for assisting blood circulation comprising: a plastic, metal or ceramic housing; an impeller wherein said impeller, in use, is magnetically urged to rotate; and at least one stator assembly.

17. (New) The pump of Claim 16, wherein at least a portion of said pump is coated with a biocompatible film.

18. (New) The pump of Claim 17, wherein said film includes titanium nitride or carbon.

19. (New) The pump of Claim 18, wherein said impeller is hydrodynamically suspended, when in use.

20. (New) The pump of Claim 19, wherein said impeller includes at least one blade.

21. (New) An implantable rotary blood pump comprising: a housing; an impeller where said impeller, in use, is magnetically urged to rotate; a hydrodynamic bearing formed by the cooperation of a surface of said impeller and said housing; and at least one stator assembly.

22. (New) A rotary blood pump comprising: a housing, at least one stator assembly, and a hydrodynamically suspended impeller; wherein said impeller carries at least one permanent magnet; and wherein said magnet produces an axis of magnetism and wherein said axis of magnetism is offset at an angle extending away from the axis of rotation of said impeller.

23. (New) A rotary blood pump comprising: a polymeric housing, a hydrodynamically suspended impeller wherein said impeller, in use, is magnetically urged to rotate; and at least one stator assembly.

24. (New) A rotary blood pump comprising: a housing; a casing, a hydrodynamically suspended impeller wherein said impeller, in use, is magnetically urged to rotate; at least one stator assembly and wherein said stator assembly and impeller cooperate to form a three phase motor.

25. (New) A shaftless rotary blood pump comprising: a housing; a casing, a hydrodynamically suspended impeller wherein said impeller is magnetically urged to rotate; and at least one stator assembly.

26. (New) A rotary blood pump comprising: a housing, a hydrodynamically suspended impeller wherein said impeller, in use, is magnetically urged to rotate, at least two

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stator assemblies wherein at least a portion of one said stator assembly is aligned at generally 45° to an axis of rotation of the said impeller.

27. (New) A rotary blood pump comprising: a housing a hydrodynamically suspended impeller wherein said impeller, in use, is magnetically urged to rotate; at least one stator assembly and, in use, movement of impeller generates axial and/or radial thrust forces.

28. (New) A rotary blood pump comprising: a housing, a impeller wherein said impeller includes an integral hydrodynamic bearing surface and, in use; said impeller is magnetically urged to rotate; and at least one stator assembly.

29. (New) A blood pump for assisting blood circulation comprising: a housing a hydrodynamically suspended impeller wherein said impeller, in use, is magnetically urged to rotate; and at least one stator assembly.

30. (New) The pump of Claim 29, wherein said pump is shaftless.

31. (New) The pump of Claim 30, wherein said impeller includes at least two blades.

32. (New) The pump of Claim 31, wherein said blades are supported by at least one support cone.

33. (New) The pump of Claim 32, wherein said support cone generates a partial bearing means by the generation of hydrodynamic thrust forces, in use.